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ABSTRACT

Research was conducted relevant to two questions: First, does generalized imitation reflect the child's failure to discriminate reinforced from non-reinforced occasions? Second, are the results which characterize generalized imitation a function of confounded social and instructional influences that operate within the procedures used in generalized imitation research? A generalized imitation experiment was conducted utilizing seven 9-year-old girls as Ss and two female graduate students as experimenter-models. Two kinds of trials were presented in each session. For the first four or five sessions, only successive-discrimination trials were presented. Following these sessions, each session contained blocks of successive-discrimination trials and blocks of choice trials. It is concluded that the generalized imitation may be the result of strong social and instructional variables. (CK)

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THE EFFECT OF INSTRUCTIONS,
DISCRIMINATION DIFFICULTY,
AND METHODS OF ASSESSMENT
ON GENERALIZED IMITATION

WARREN M. STEINMAN

A Symposium Paper Presented at the Biennial Meetings
of the Society for Research in Child Development,
Minneapolis, Minnesota, April 2, 1971

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The Effect of Instructions, Discrimination Difficulty, and
Methods of Assessment on Generalized Imitation¹

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The term, "generalized imitation," was used by Baer and Sherman (1964) to describe the imitative behavior of children who were differentially reinforced for imitating a series of simple responses. It was found that although the children were reinforced only when they imitated certain responses and not other responses, differential imitation did not develop. Instead, the children continued to imitate the non-reinforced responses as long as the other set of responses continued to be reinforced. In other words, unlike many other situations involving the use of differential reinforcement procedures, the consistent and long-term use of differential reinforcement in the Baer and Sherman study was not sufficient to produce differential imitation. Since the initial demonstration of generalized imitation by Baer and Sherman, several other experimenters have replicated these findings in a variety of situations, using children of various ages and clinical classifications, and using responses of various topographies and complexities. Thus, the basic issue that the generalized imitation research poses is to determine why differential reinforcement procedures are so strikingly ineffective when used in the generalized imitation paradigm.

In recent years, several theoretical explanations have been proposed to account for the continued imitation of non-reinforced responses in generalized imitation research. Although not always explicitly stated as such, a fundamental premise underlying all of these explanations is the presumption that the child fails to discriminate the contingencies associated with the various responses being modeled (cf. Steinman and Boyce, 1971). Albert Bandura has been most direct in advancing this discrimination analysis of generalized imitation. He has suggested that the discrimination required in generalized imitation studies simply may be too difficult for the child to acquire. Indeed, if we look at the

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procedures used in generalized imitation research, the discrimination-difficulty explanation seems quite reasonable. In most of these studies, several different responses are modeled in random succession. In some studies, as many as 30 or 40 different responses may be used, with their order of presentation varying randomly from session to session. Thus, due to the number of responses modeled, the complexity of the responses modeled, the similarity between responses modeled, and the random sequencing of responses, the child may have difficulty discriminating the contingencies associated with the various responses and, therefore, he simply imitates every response. Bandura proposes that, "if, on the other hand, the discriminative complexity of the modeling task were reduced. . . (the child) would eventually recognize that the non-reinforced responses never produced positive outcomes and he would, in all likelihood, discontinue reproducing them (Bandura, 1969, p. 126)."

To restate Bandura's proposal, and those that are similar to it, what is being suggested is that generalized imitation is an example of a learning or acquisition failure, rather than being a performance or motivational problem. In short, according to the discrimination analysis of generalized imitation, generalized imitation results from a failure to learn which of the model's responses produce reinforcement when imitated, and which do not.

The research which I will describe today is relevant to two questions: First, does generalized imitation reflect the child's failure to discriminate reinforced from non-reinforced occasions? That is, is the ineffectiveness of differential reinforcement in generalized imitation research a direct result of the difficulty of the discrimination to be learned? Or, alternatively, are the results which characterize generalized imitation a function of confounded social and instructional influences that operate within the procedures used in generalized imitation research?

The procedures used in generalized imitation research suggest several alternatives to the discrimination-difficulty analysis. In almost every generalized imitation experiment, essentially the same procedures have been employed. The child is seated directly in front of an experimenter who, in most studies, is an adult. The experimenter then proceeds to model several different responses singly and successively, with the modeling of each response constituting a trial. Although imitation accuracy is used as a measure in some experiments, in most studies all that is recorded is whether the response modeled is imitated adequately or not. In addition, the response being modeled typically is preceded

by some form of physical, observational, or verbal prompt or instruction, such as, "Do this," or "Say." In other studies, these verbal prompts are used only before the first few responses of the first session and are omitted thereafter. In still other studies, although verbal prompts are omitted, the child is told at the beginning of the experiment that he will be reinforced if he does what the model does. Also, in almost every study, regardless of whether the particular response modeled on a trial is a reinforceable response, and regardless of the child's behavior, the interval between responses modeled (that is, the inter-trial interval) is held constant.

These procedures, in and of themselves, might be sufficient to maintain non-reinforced imitations whether or not the particular response modeled on a trial is discriminated as an occasion for non-reinforcement. Under these conditions, the child has only three alternatives available on each trial: (1) imitate the response modeled; (2) respond incorrectly, or (3) wait, without responding, until the next response is modeled. To the extent that variables other than those involved in the discrimination of reinforced and non-reinforced responses function to control the child's behavior, for example, the explicit or implicit instructions to imitate, the awkward delay following the modeling of each response, the absence of other acceptable and reinforceable behavior in the situation, the continued presence of the experimenter-model, and so forth, non-reinforced imitations might occur even when the child has clearly learned that the particular response modeled on a trial will not be reinforced if imitated. In short, it might be more aversive to the child to withhold an imitative response under these conditions than it is to perform the response, even if the response is a non-reinforced one and is discriminated as such. In other words, generalized imitation under these procedures may be more a function of the child's reinforcement and punishment history with respect to compliance than it is a function of his ability to discriminate explicit response contingencies.

If generalized imitation is a function of the social and instructional influences operating within the procedures used in generalized imitation research, rather than being a function of discrimination difficulties, one should be able to demonstrate the effect of these influences either by manipulating them directly or by making them irrelevant. For example, by offering the child a choice between a reinforced and a non-reinforced response, the social and instructional influences would become irrelevant. Although they still may function to assure that an imitative response will occur, the response contingencies could determine

which response might be emitted. By presenting both kinds of trials, that is, successive discrimination trials, like those used in other generalized imitation studies, and choice trials, a test of Bandura's discrimination analysis is possible. If the child fails to imitate discriminatively on the choice trials as well as on the successive-discrimination, single-response trials, the discrimination-difficulty analysis of generalized imitation would not be discredited (because no evidence that the response contingencies had been learned would be available). However, if the child responds discriminatively on the choice trials, but then continues to imitate the same responses indiscriminatively on the successive-discrimination trials, the discrimination-difficulty analysis of generalized imitation would be less tenable.

Over the last few years we have conducted several generalized imitation experiments that have included both choice trials and successive-discrimination trials. Rather than reviewing each of these studies, I would like to use one as an example and will describe it in some detail.

In the study, six 7-9-year-old girls, selected from a local public school,² served as subjects. Two female graduate students served as experimenter-models. For three of the children, one experimenter modeled only the reinforceable responses, while the other experimenter modeled only the non-reinforceable responses. For the other three children, the experimenters' roles were reversed. The responses used are presented in Figure 1. There were eight reinforceable responses -- which I will call the S^D responses, that is, responses which, when modeled, set the occasion for a reinforced imitation. All of the S^D responses involved the use of the hands. There also were four non-reinforceable responses -- or, as I'll call them, S -delta responses, that is, responses which, when modeled, set the occasion for a non-reinforced imitation. Two of the S -delta responses involved the use of the hands; one involved use of the feet, and one was a verbal response.

Two kinds of trials were presented in each session. On successive discrimination trials, an experimenter entered the room, said "Do this," modeled a response, waited 10 seconds, and then left the room. Five seconds later, an experimenter entered the room again and the process was repeated. The order with which responses were modeled was randomly determined until all 12 responses had

²The author wishes to thank Mr. Donald Holste, Principal of Prairie Public School, and Mr. David Phillips, Program Supervisor of Title III, for their cooperation in this research.

been presented. Then, both experimenters entered the room for a series of eight choice trials. Each choice trial was preceded by one experimenter saying, "Do this," then modeling a response, followed by the other experimenter saying, "or do this," and modeling a second response. The S^D and S-delta responses were modeled in this fashion in random pairs until all four S-delta responses had occurred once as the first response of a pair and once as a second response in the pair.

The reinforcers delivered were beads, which could be traded at the end of a session for a pre-selected toy when enough beads had been earned to fill a small paper cup.

For the first four or five sessions, only successive-discrimination trials were presented. Three blocks of 12 trials were given in each session. Within each block, each of the 12 responses was modeled once with the order of presentation re-randomized in each block. The data for each subject in these first four or five sessions can be seen in the boxed-in sections of Figure 2. The closed circles refer to the percentage of S^D responses imitated and the open circles refer to the percentage of S-delta responses imitated. As can be seen in the figure, except for Subject 5 who failed to imitate a couple of S-delta responses in one session, every response was imitated, regardless of its reinforcing consequences. This is a typical generalized imitation result, using typical generalized imitation procedures.

For the next 11 or 12 sessions, each session contained blocks of successive-discrimination trials and blocks of choice trials. A block of 12 successive-discrimination trials was followed by a block of eight choices, followed by a second block of 12 successive trials and another block of eight choices. The results of the successive-discrimination procedures are highlighted in Figure 3. Again, closed and open circles refer to the imitation of S^D and S-delta responses, presented successively. As you can see, except for Subject 5, every singly presented response continued to be imitated by each child throughout the several sessions. The S-delta responses imitated by each child on the choice trials of these sessions are highlighted in Figure 4. Except for one subject, Subject 6, who exhibited the equivalent of a position preference on the choice trials by almost always imitating the last of the two responses modeled, five children clearly demonstrated that they discriminated which responses produced reinforcement and which didn't. Indeed, for three subjects (S_2 , S_3 , and S_5), the S^D responses were chosen on every choice trial for the last 10 sessions, even though

the same S-delta responses were almost invariably imitated in the same sessions when presented successively. It hardly seems reasonable, therefore, to attribute the generalized imitation of these subjects on the successive-discrimination trials to a failure to discriminate response contingencies.

As a further manipulation in the study, instructions were changed. After two or three sessions which contained only successive-discrimination trials, each child was told at the beginning of a subsequent session that he was not supposed to imitate the responses that he did not get a bead for imitating. The "do this" instruction still preceded the modeling of every response. Only the instruction at the beginning of the session was changed. The effect of this instruction not to perform S-delta responses can be seen in the boxed-in section of Figure 5. As can be seen, four of the six children immediately stopped imitating every S-delta response, while continuing to imitate every S^D response under these changed instructions. Even Subject 6, who previously responded randomly on the choice trials, demonstrated perfect discriminative imitation on the successive-discrimination trials following this instruction. It should be noted that it would be impossible for these four subjects to perform as they did following the instructional change, if they had not previously learned which responses produced reinforcement and which did not. It also follows, therefore, that the preceding indiscriminative behavior on the successive-discrimination trials could not have been due to a failure to discriminate reinforced from non-reinforced responses.

The next procedure in the study also involved instructional manipulations. Instead of being told, "Don't do the responses that you do not get reinforced for doing," a less directive instruction was given. The children were told at the beginning of each session, "Today, I don't care what you do. If you want to do the ones that you don't get a bead for doing, that's okay. If you don't want to do them, that's okay too. It's up to you." As usual, the "Do this" instruction still preceded the modeling of each response. The next figure (Figure 6) highlights the results of this change in instructions. As you can see, under these more ambiguous instructions, S-delta imitations became more variable. Generally, however, a more intermediate percentage of S-delta imitations was obtained than was obtained under the preceding instruction.

Finally, in the last session of the study, no special instructions were given preceding the session. In other words, the session began as did all other sessions before the instructional manipulations were instituted. As can be seen

in Figure 7, under these conditions, complete generalized imitation was recovered.

In another, related study, the discrimination analysis of generalized imitation was investigated by systematically varying the topographical similarity between reinforced and non-reinforced responses. The 10 S^D responses used all involved the positioning of hands and arms. Five S-delta responses were similar to the S^D responses in that they also all involved hand and arm positions. Five other S-delta responses were less similar to the S^D responses in that they all involved positioning of the feet instead of the hands. Thus, if generalized imitation is a function of discrimination difficulty, the dissimilar (foot) S-deltas should be less likely to continue to be imitated than the more similar (hand) S-deltas.

In the study, four 7-year-old boys served as subjects. Unlike the study described previously, only one model was used -- a female graduate student -- and she remained in the room throughout the session. Beginning with the first session, blocks of choice trials and blocks of successive-discrimination trials were presented in every session. All other procedures were similar to those described for the last study.

The results of these manipulations can be seen in Figure 8. For clarity, only the S-delta imitations are graphed. The closed circles refer to imitations of the "hand" S-delta responses that were similar to the S^D responses. The open circles are imitations of the dissimilar "foot" S-deltas. The circles connected by broken lines indicate performance on the successive-discrimination trials. The circles connected by solid lines indicate performance on the choice trials.

As can be seen on the successive-discrimination trials, almost every S-delta response, regardless of its similarity to the S^D responses, was imitated throughout the several sessions. The effect of discrimination difficulty was seen only on the choice trials. As in the preceding study, even when the choice trials clearly demonstrated that the children had discriminated at least some of the responses as being non-reinforced if imitated, still those responses invariably were imitated when presented under the successive-discrimination procedures which characterize generalized imitation studies. Thus, again, the discrimination analysis of generalized imitation was not supported.

In both of the studies that have just been described, the instruction, "Do this," preceded the modeling of each response. Although, as has been noted earlier, several other generalized imitation studies have eliminated these explicit verbal instructions early in the experiment or have not included them at

all and still have obtained generalized imitation, the results of the experiments I have just described have been attributed by some investigators to the continued application of the "Do this" instruction, rather than being due to the social and instructional control that the generalized imitation procedures themselves initiate and maintain. Bandura and Barab (1971), for example, have suggested that the "Do this" instruction "coerces" the child into responding and they suggest that generalized imitation would be less likely if the "Do this" were absent. To examine this possibility more directly, two experiments recently were conducted in which explicit verbal instructions were reduced.

In one study, conducted in collaboration with Rodger Bufford, eight girls selected from the first-grade classes of a local public school³ served as subjects. Mr. Bufford was the experimenter-model. In the study, only two responses were modeled -- one S^D response and one S-delta response. In each session, each of the two responses was modeled 15 times in random alternation with a 10-second intertrial interval separating the modeling of each response. Thus, there were 30 successive-discrimination trials in each session and all the child had to learn were the contingencies associated with two responses.

At the beginning of the first session of the experiment, and only in the first session of the experiment, two different responses were modeled. They were modeled only once at the beginning of the first session and never were modeled again in the experiment. For four of the eight children, a "Do this" instruction preceded the modeling of these two initial responses and the instruction never was repeated thereafter. Thus, for these four children, the "Do this" instruction never preceded the S^D or the S-delta response used in the remainder of the experiment and, indeed, never occurred following the first two trials of the first session. For the other four subjects, the "Do this" instruction continued to precede the modeling of every response throughout the study.

The results for the first 10 sessions of these manipulations can be seen in Figure 9. Unfortunately, Subject 8 was available only for eight sessions and, although the study continued for 25 sessions, we only had time to graph the data for the first 10 sessions before this meeting. However, the data for the last 15 sessions are essentially identical to the data you see for the first 10 sessions. That is, even after 25 sessions, containing 750 trials, with only one

³The author wishes to thank Mr. Gary Howrey, Principal of Prairie Public School, and Mr. David Phillips, Program Supervisor of Title III, for their cooperation in this research.

S^D response and one S-delta response to discriminate and no "Do this" instruction for four of the subjects following the first two responses of the first session, no discriminative imitation developed. Thus, it seems quite unlikely that the continued use of a verbal instruction such as, "Do this," is essential to the maintenance of generalized imitation.

In a second study, conducted in collaboration with Ben Cooley, verbal instructions were eliminated entirely. As in the Bandura and Barab (1971) study, children (in this case, four girls from first-grade classes) were given the opportunity to observe another child who was performing imitatively. That is, a child-confederate was instructed by the experimenter to do what the experimenter did. These instructions, of course, were given in the subject's absence. The child-confederate and the child-subject then were brought into the experimental room. The experimenter first modeled one or two responses while facing the child-confederate, which of course she imitated. Then, the experimenter faced the child-subject and modeled one or two responses. This procedure continued until each child had imitated 20 responses and then the session was ended. Every imitative response emitted in this first session was reinforced with a tradable token and, as in the Bandura and Barab experiment, the observational procedure was sufficient to produce consistent imitative responding by all four subjects.

In all sessions following the first session, the child-subject performed without the confederate present. Starting with the second session, each child had 10 S^D responses -- all hand-positioning responses -- and five S-delta responses -- all foot-positioning responses -- modeled by the experimenter in random succession, with a 10-second intertrial interval. In each session, each response was modeled three times, for a total of 45 responses per session.

The results of these procedures can be seen in Figure 10. As can be seen, although the imitative behavior was initiated by observational procedures rather than by verbal instructions, generalized imitation still resulted and was maintained.

In the final session of the study, the four children were given a contingency-recognition test. That is, each response was modeled by the experimenter in a random order and the child was instructed to tell the experimenter whether the particular response modeled previously had been reinforced when imitated. Subjects 1 and 4 correctly identified the contingencies associated with all 15 responses. Subject 2 correctly identified 14 of the 15 responses. And, Subject

3 correctly identified 12 of the 15 responses. Thus, again, a discrimination analysis of these results seems inadequate. Following the recognition-test procedures, the imitation procedures were resumed. When resumed, all four children continued to imitate every response modeled.

In conclusion, when combined, the several studies that have been described strongly suggest that the generalized imitation obtained under the procedures commonly used in generalized imitation research may be the result of strong, but largely unanalyzed, social and instructional variables, rather than being a function of the child's inability to discriminate the specific reinforcement contingencies associated with the particular responses being modeled. Therefore, the generalized imitation paradigm might better be considered as one in which the social-learning history of the child has greater control over the child's behavior than do the specific differential reinforcement contingencies being manipulated. Thus, one might view the generalized imitation situation as one in which two contingency systems are operating simultaneously. One system involves the explicit differential reinforcement being manipulated by the experimenter-model contingent upon S^D and S -delta responding. The second, less explicit, yet more powerful contingency system derives from the child's history of reinforcement and punishment regarding compliance with social demands. If, in the absence of an acceptable alternative response and in the presence of an influential model, the child assumes that he is expected to respond, he is likely to do so since, by responding, he may avoid potential disapproval or maintain potential approval. It also is likely, therefore, that the manipulation of at least four parameters should affect the probability of obtaining generalized imitation under these conditions: 1) Generalized imitation should be affected by the manipulation of the child's assessment of what is expected. This can be accomplished through the use of verbal instructions; or by having the child observe other (credible) subjects performing differentially, or, perhaps, by giving the child a preceding experimental history in which differential responding in situations progressively like the generalized imitation situation is developed. 2) Generalized imitation should be affected by the specific social characteristics of the experimenter-model. For example, a model of high prestige, status, or power should be more likely to produce generalized imitation than a model having the opposite characteristics. In short, the stronger the potential effect of the model's approval or disapproval, the greater the likelihood of generalized imitation being maintained. 3) As with the preceding parameter, generalized imitation should be

reduced to the extent that the social control exercised by the model is reduced. Thus, by having the child perform alone (as in the Peterson and Whitehurst study described earlier) the social setting conditions are modified in such a way as to reduce the threat of disapproval for non-compliance and the potential approval for compliance. 4) Finally, generalized imitation should be reduced if the differential reinforcement procedures employed are modified to include punishment for imitating S-delta responses as well as reinforcement for imitating S^D responses. It is conceivable, for example, that by adding sufficient response-cost or time-out punishment when S-delta responses are imitated, the penalty for performing an S-delta imitation could be made to exceed the strength of the social demand to imitate and, thus, discriminative imitation would result. This, incidentally, could provide an interesting measure of the strength of the social demand.

Currently, we are conducting research related to each of these parameters. However, a description of that research best be delayed until a future symposium.

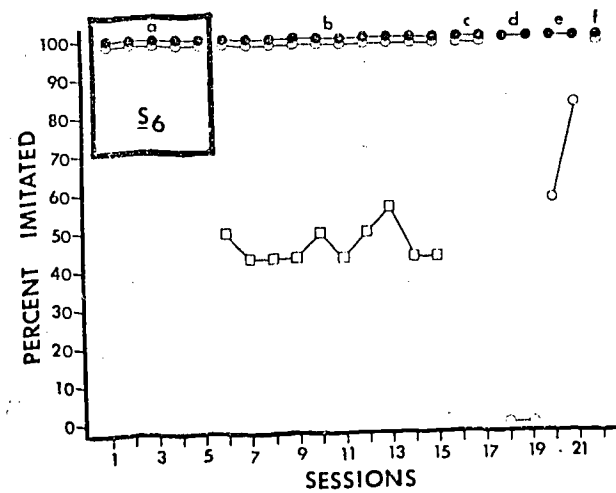
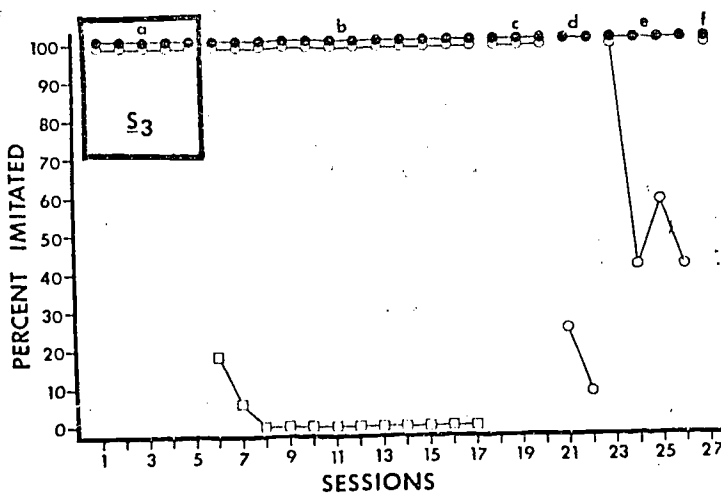
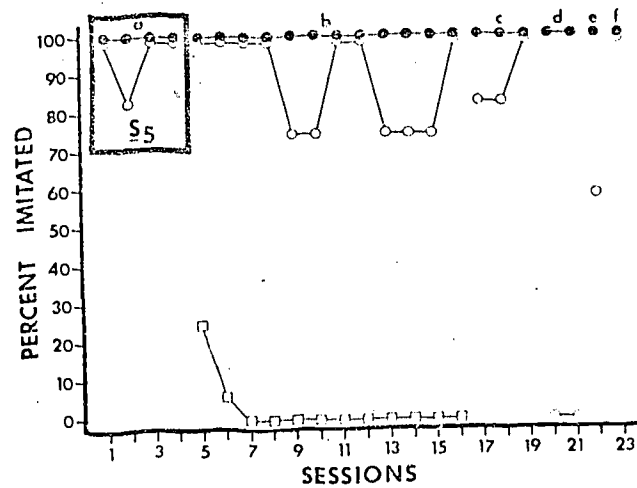
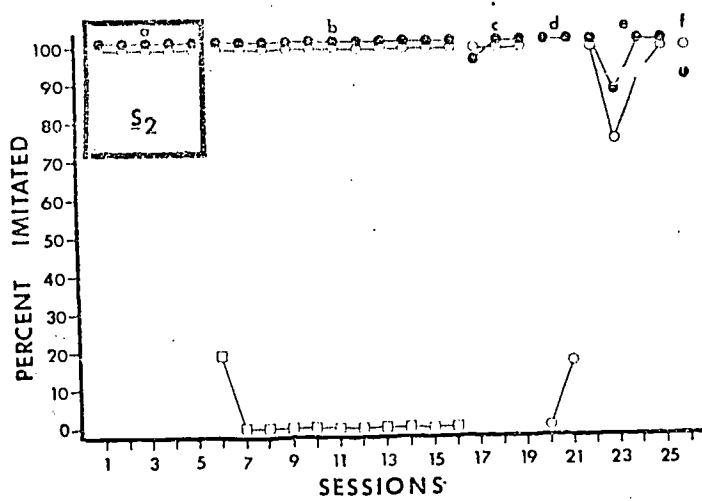
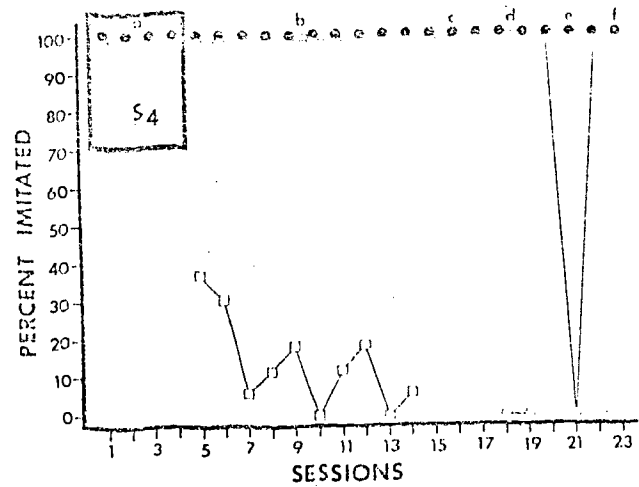
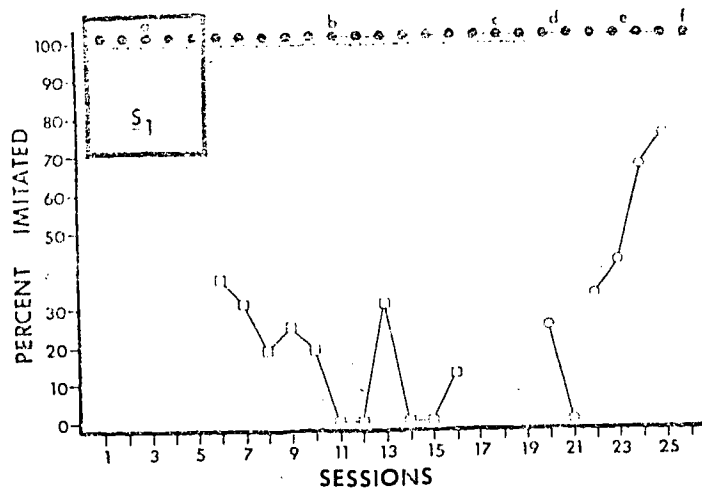
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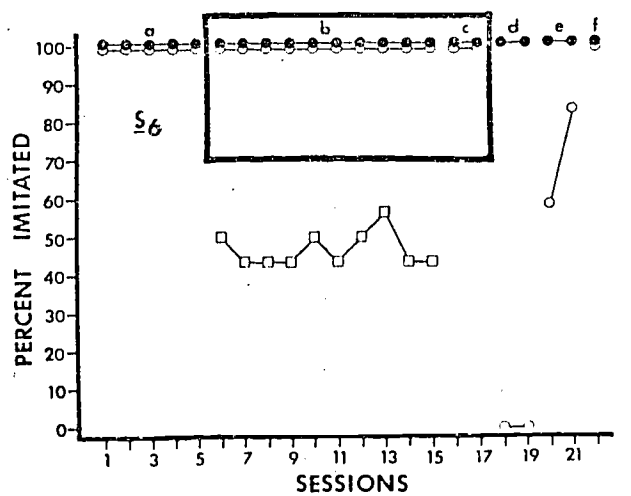
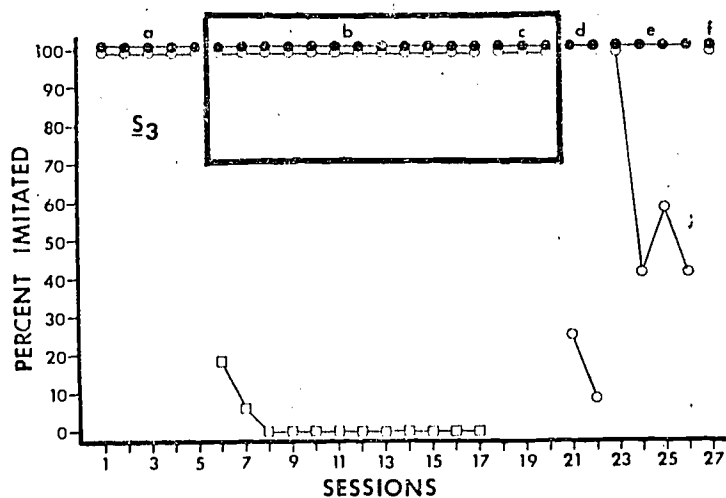
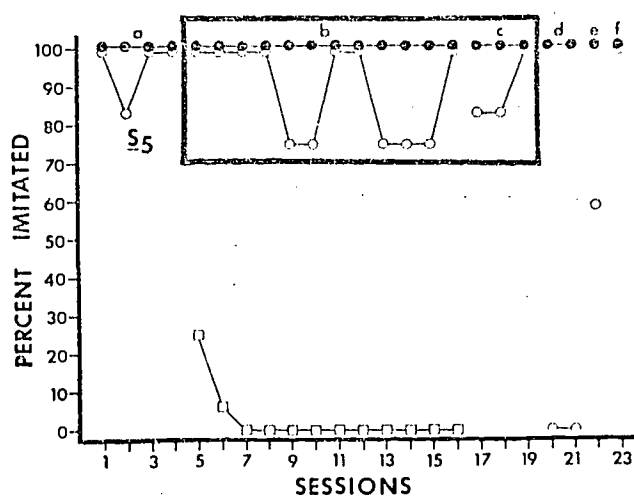
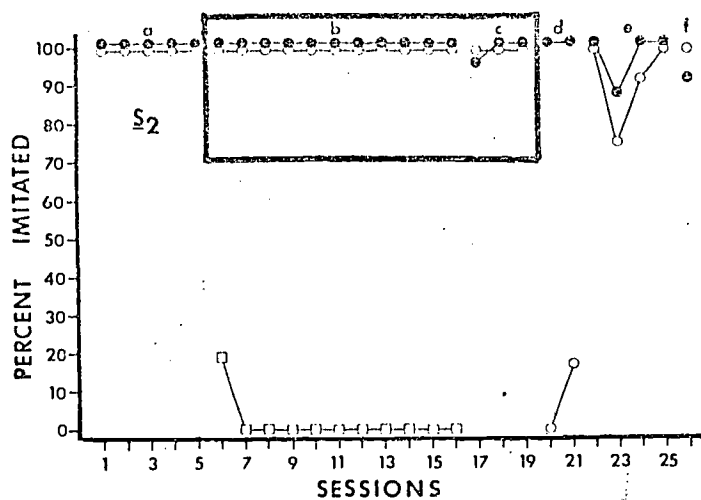
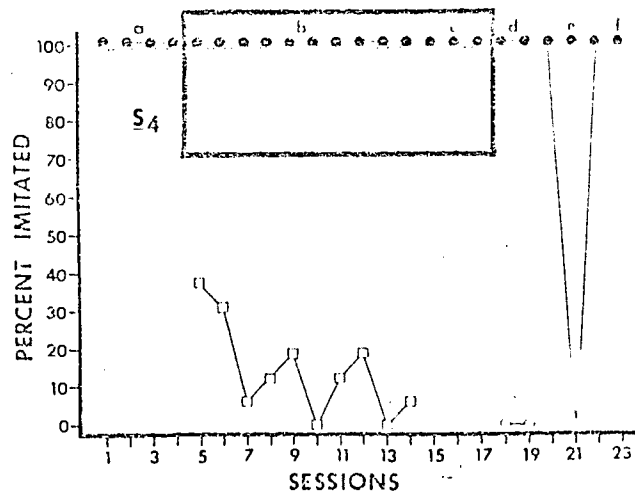
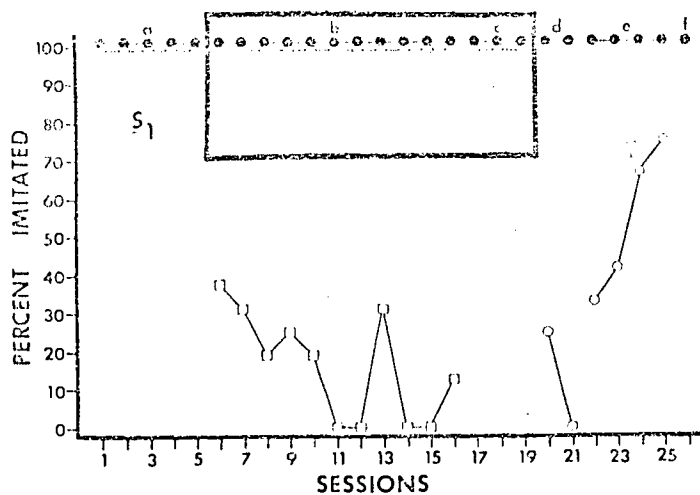
Reinforced (S^D) Responses

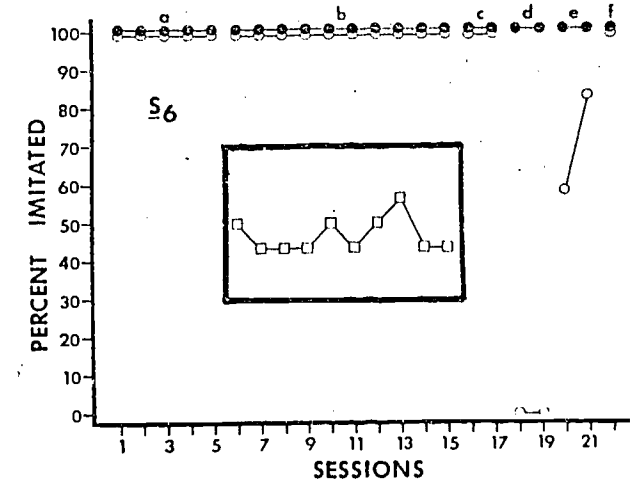
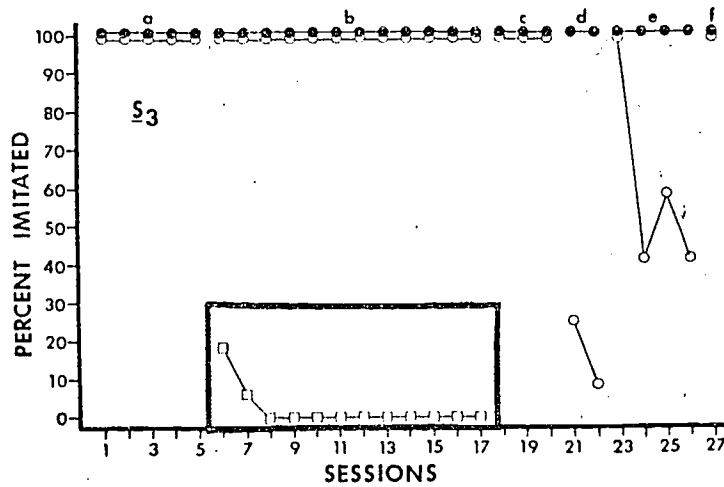
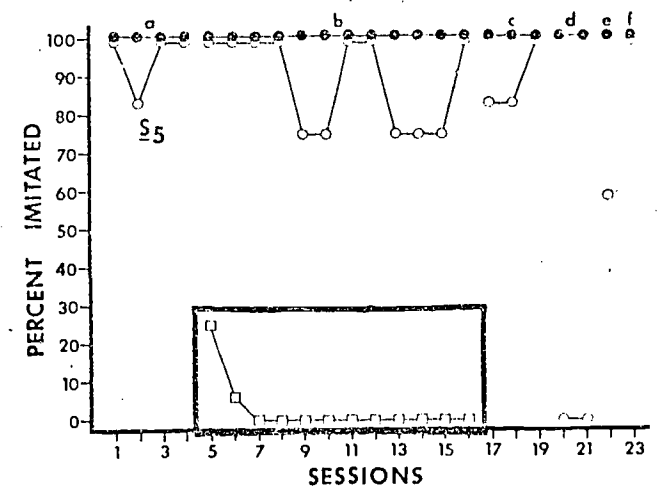
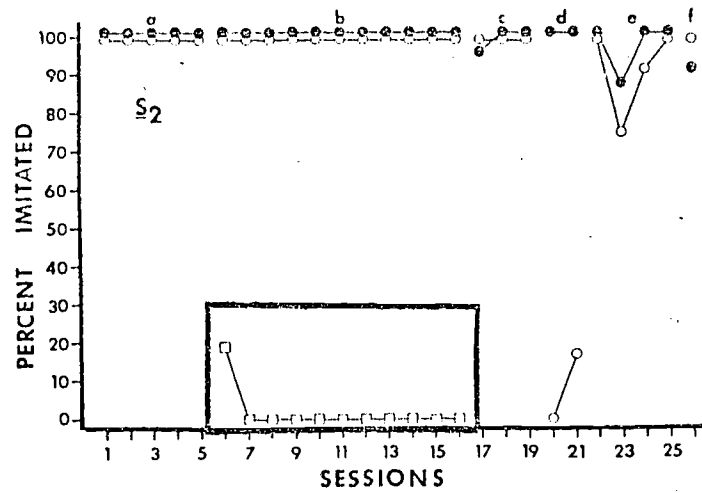
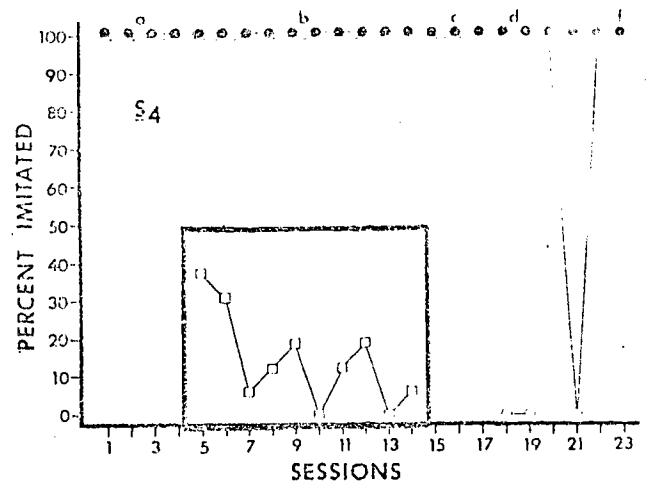
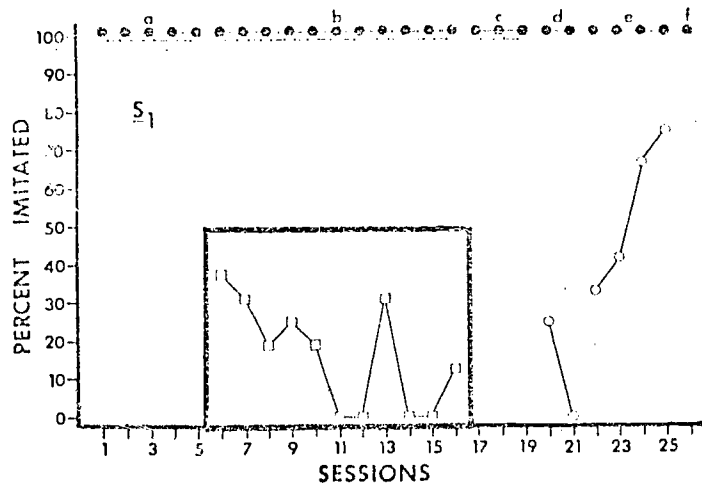
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4. Hands on top of head
5. Clap hands
6. Hands flat on table
7. Roll pencil on table
8. Pick up paper bag

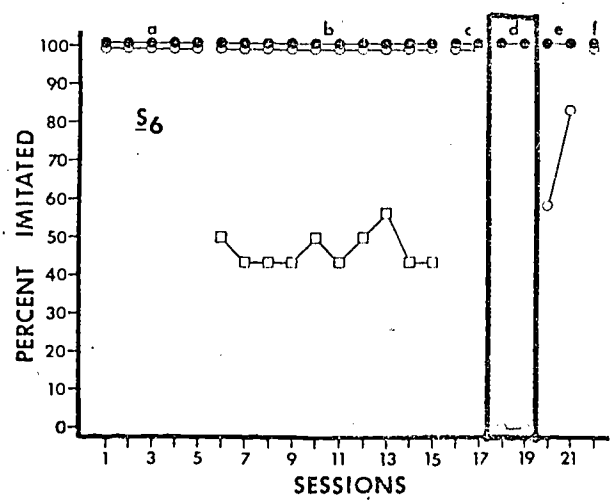
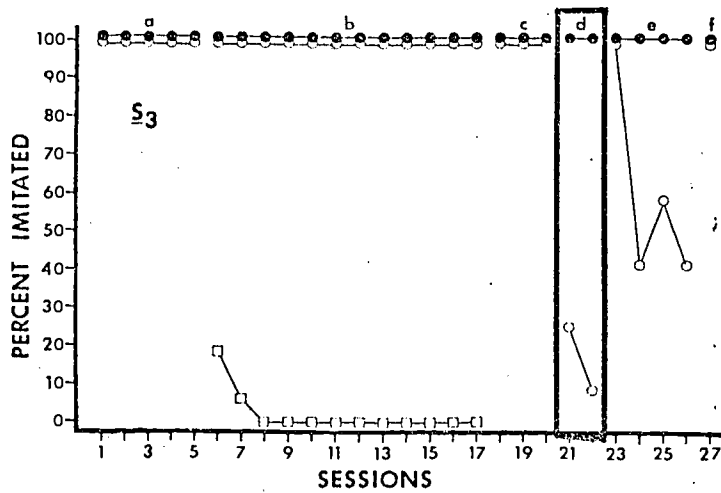
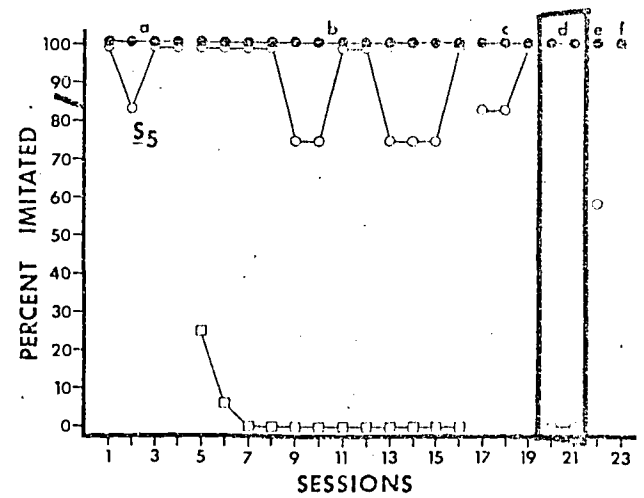
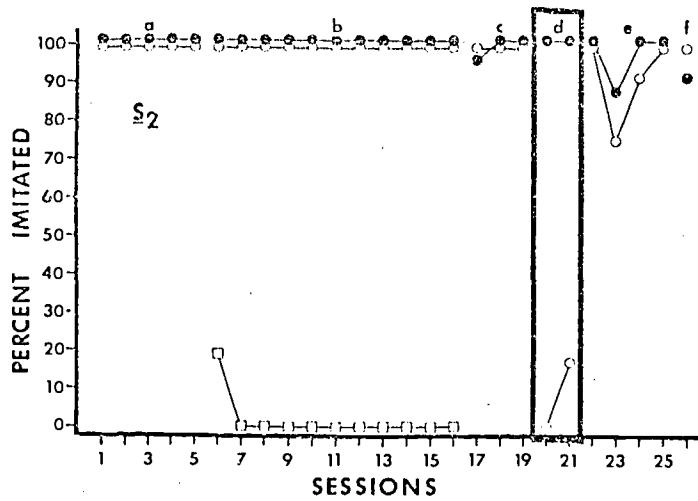
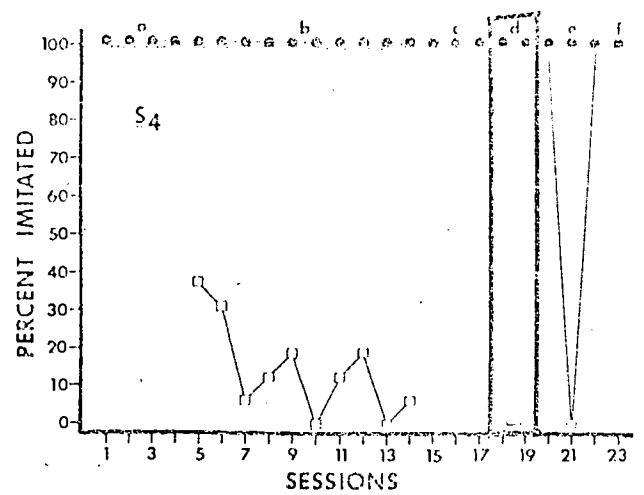
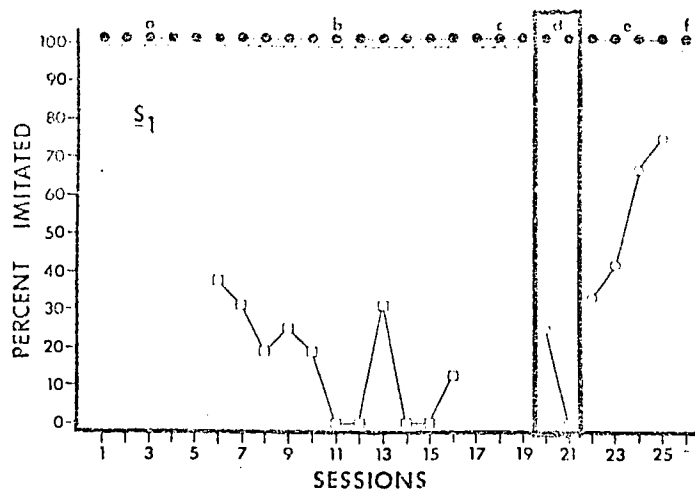
Unreinforced (S -delta) Responses

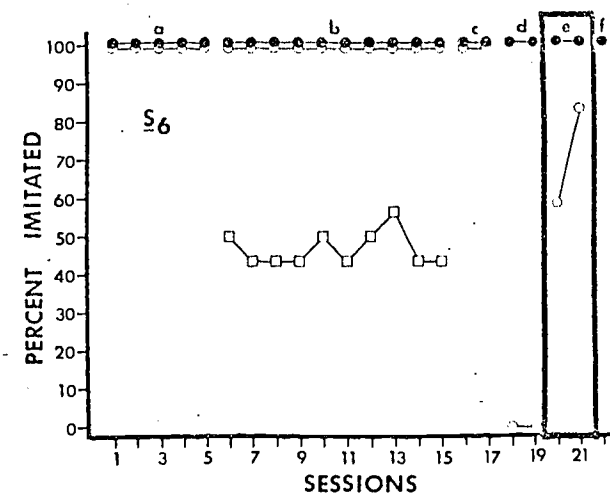
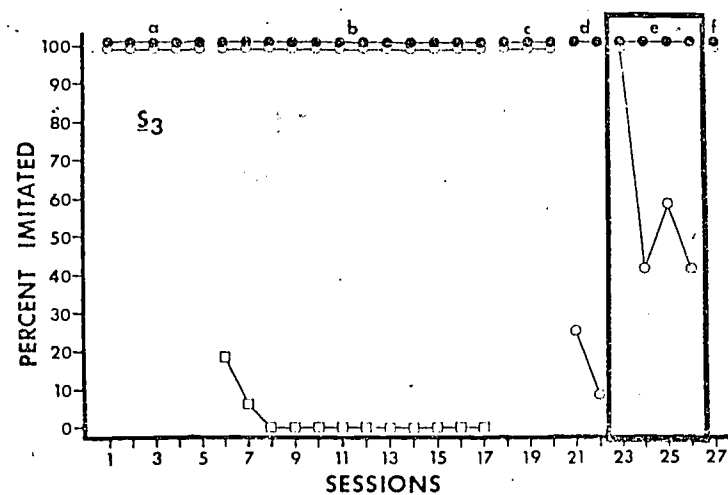
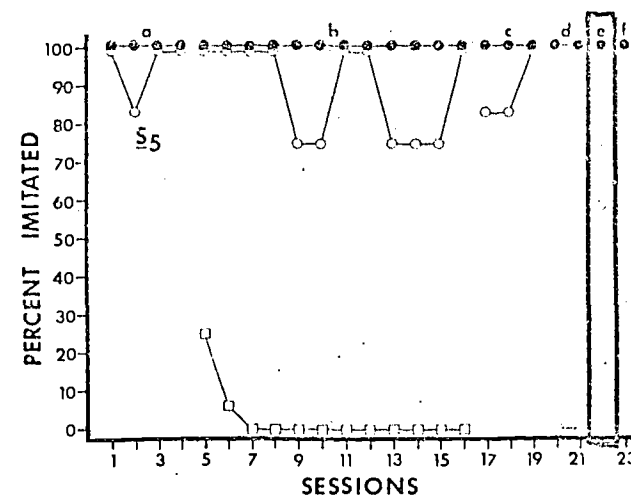
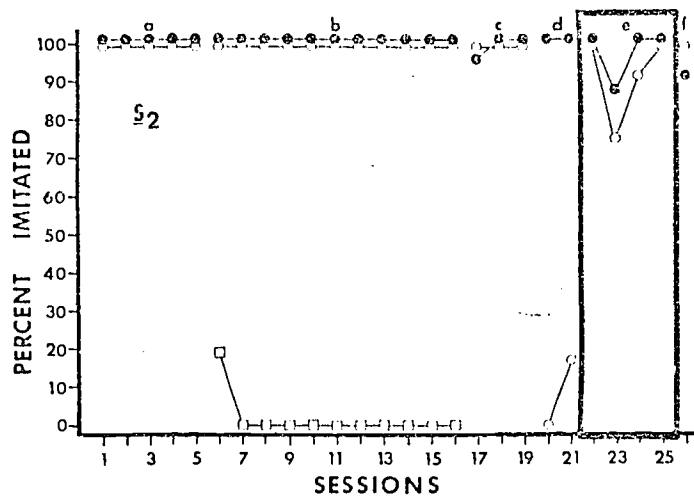
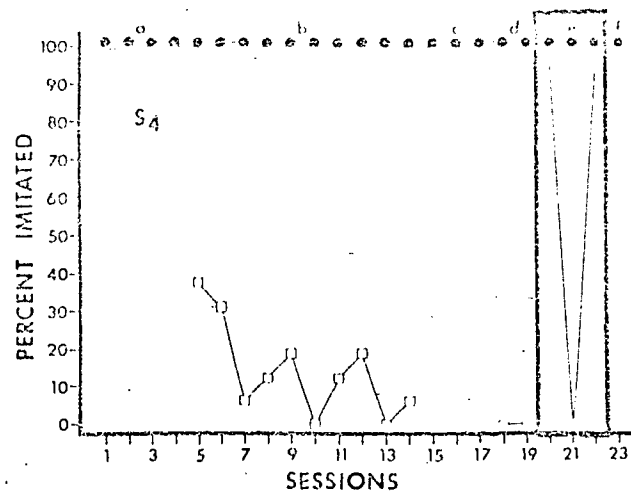
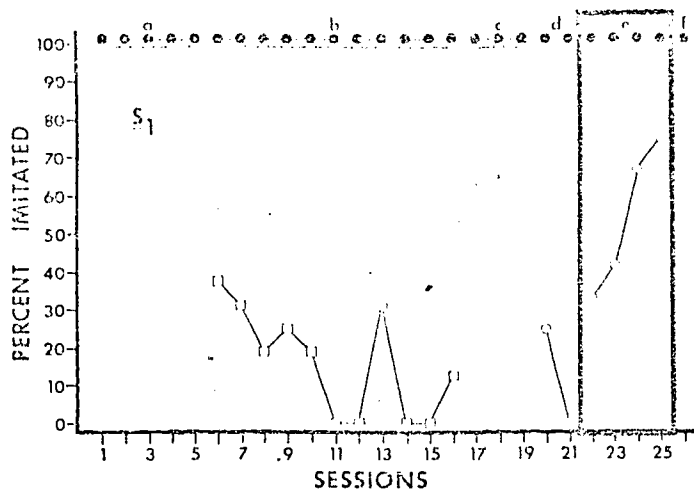
1. Hands folded on table
2. One eraser put on top of another
3. Rotate feet
4. Verbal statement, "Good-bye"

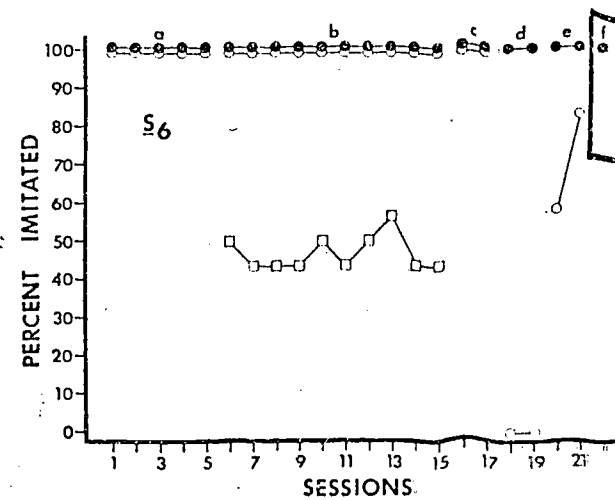
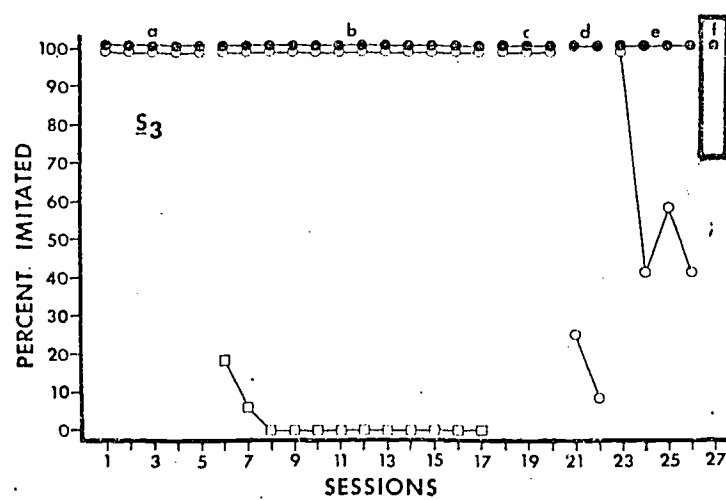
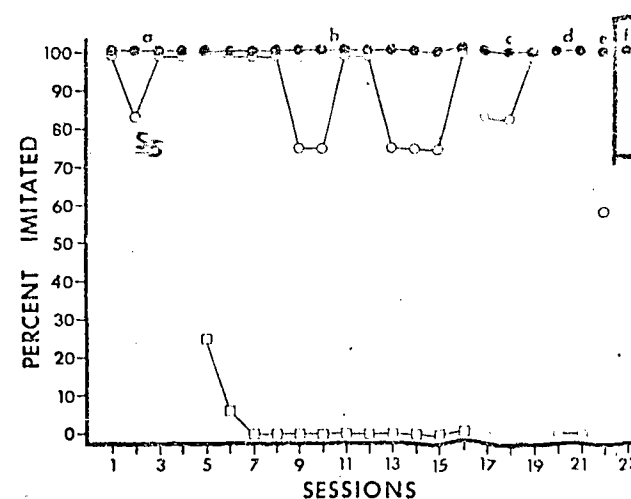
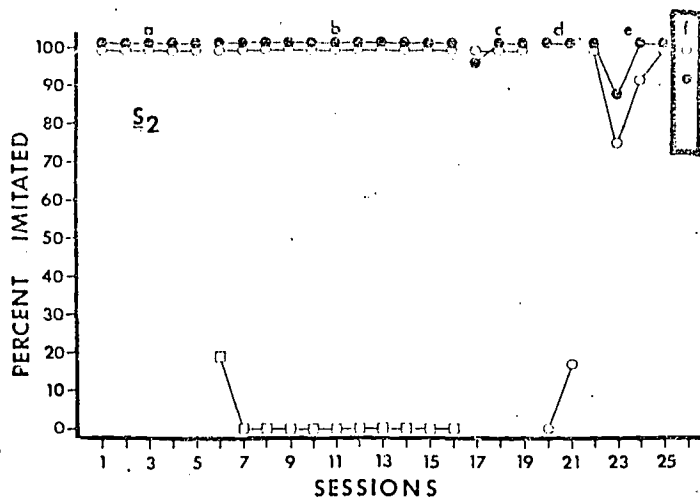
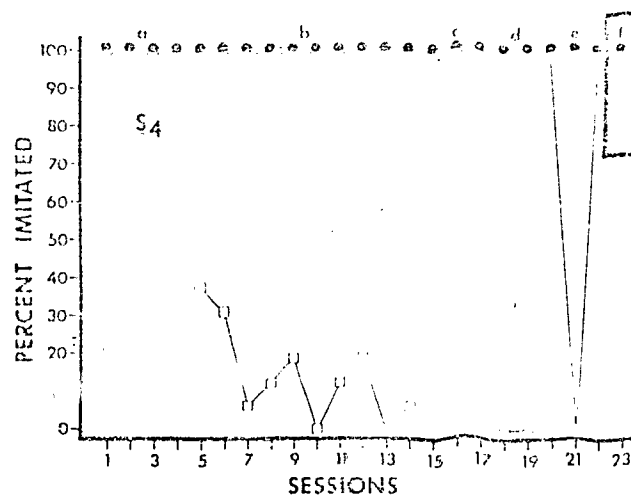
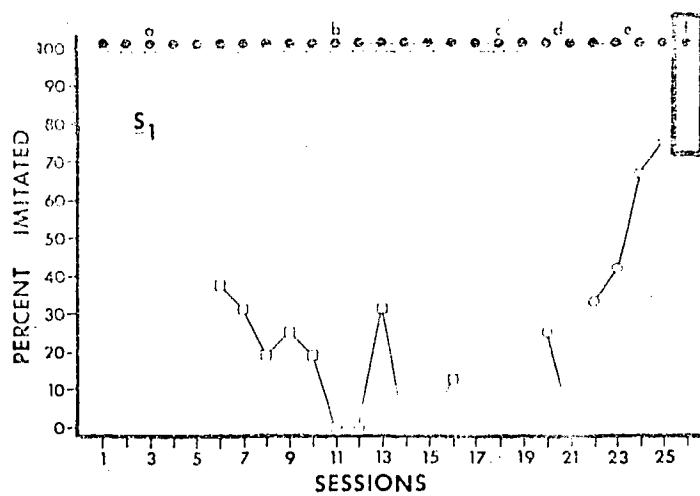




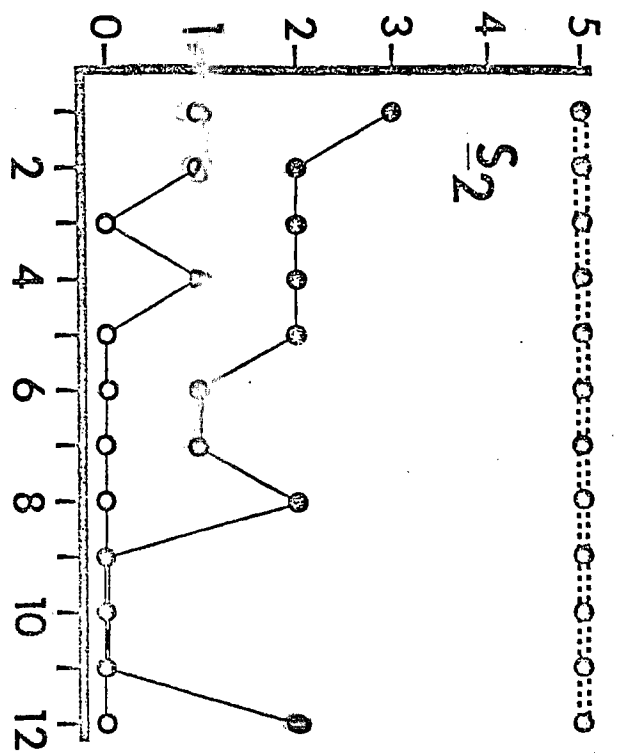
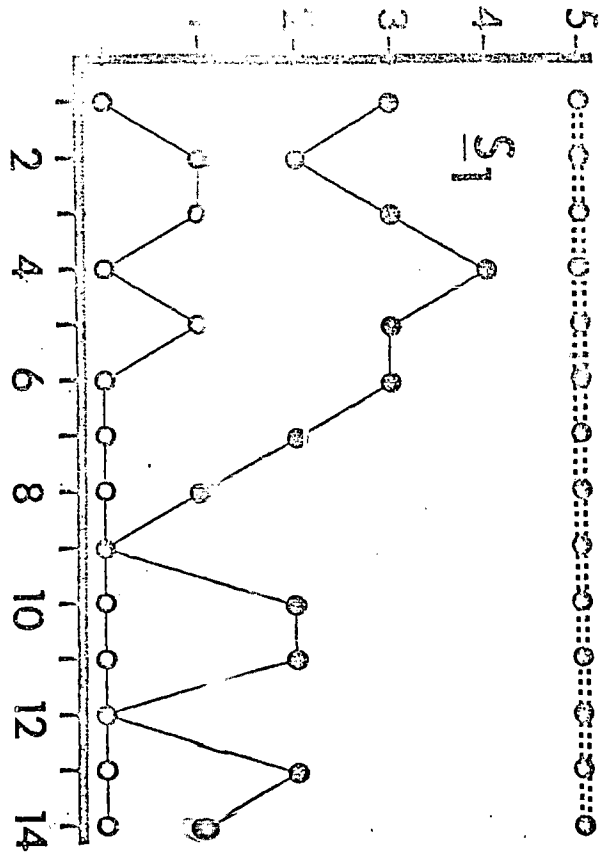




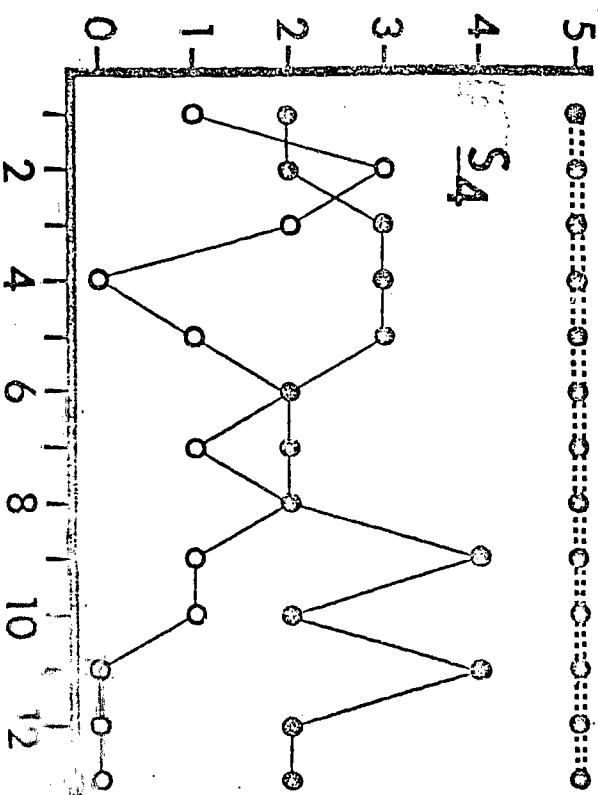
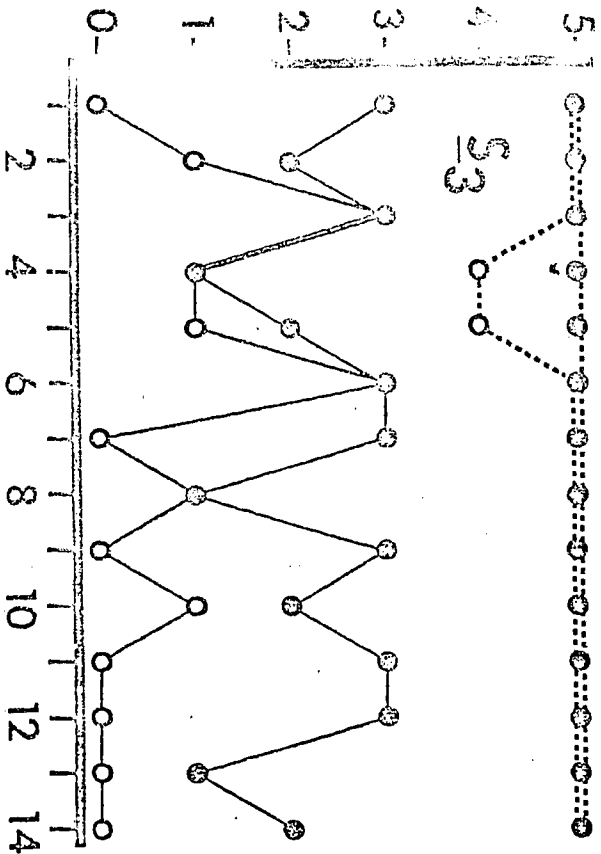




S^{Δ} IMITATIONS



S^{Δ} IMITATIONS



PERCENT INITIATED

